

Presentation Abstract

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Presentation: 415 - Japanese encephalitis in a peri-urban pig slaughterhouse of Cambodia : a dynamical modeling approach to quantify the risk of transmission to humans

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Abstract:

Purpose:
 Japanese encephalitis virus (JEV) is the most important cause of acute encephalitis in Eastern/Southern Asia. The basic transmission cycle involves *Culex* mosquitoes, pigs, and Ardeid birds. Cambodia has been facing high population growth in urban areas, associated with an increase of pork consumption, and consequently, the implantation of pig slaughterhouse in peri-urban areas. Pigs that transit through Cambodian slaughterhouses use to come from the whole country, but also from Thailand and Vietnam where the disease is endemic. Depending on age, origin country and transportation duration, these pigs may arrive either susceptible, infectious or removed from JE infection. Due to the presence of *Culex quinquefasciatus*, a JE competent mosquito vector, in peri-urban areas, and in a country where JE vaccination is not available countrywide, the risk of JE urban transmission is increasing.

Methods:
 We developed a deterministic model consisting in two Susceptible Exposed and Infectious (SEI) models for two species of mosquitoes, one rural and one per-urban species, coupled with a Susceptible and Removed (SR) model for humans. To estimate the model parameters, we used (i) for pigs, a flow dynamic survey associated with a serological survey performed in the pilot slaughterhouse, (ii) for mosquito densities a longitudinal trapping survey in the same location, (iii) data from the literature. We performed a sensitivity analysis of this model.

Results:
 According to this model and by choosing realistic values for the parameters, the slaughterhouse-induced annual incidence was estimated to be 0.14%, potentially resulting in 9 human cases a year. : the number of infected individuals - 2 mosquitoes species and humans - is very sensitive to pig JE prevalence at the slaughterhouse. These three output variables are also very sensitive to the average number of meals a mosquito of both species can have by unit of time, the probability that a mosquito feed on a pig (respectively on a human) and the infection rate of mosquitos by meal for both species

Conclusions:
Further investigations are needed to refine this risk and recommend prevention measures in Cambodian urban areas.